



Ohio Department of Natural Resources Division of Soil and Water Resources Fact Sheet

Fact Sheet 01-62

Understanding Your Water Well

Ground water is found beneath the earth's surface and is one of Ohio's most important resources, supplying water to thousands of wells serving homes, industry and agriculture. In fact, Ohio is ranked in the Top 10 nationally for the number of private water wells drilled. However, very few well owners know how to evaluate the efficiency of their well.

Well Log and Drilling Reports

Once a well has been drilled using approved construction materials and methods, the driller completes a Well Log and Drilling Report form. This well log form contains valuable information on the formations encountered during drilling, how the well was constructed and the efficiency of the well. The driller has been required to fill out this form and submit it to the ODNR Division of Water (DOW) since 1947. A copy of the water well log (if filed) is available free of charge by contacting the DOW or by searching the online water well database at: <http://www.dnr.state.oh.us/water/maptechs/wellogs/appNEW/>.

Pumping Test and Well Yield

Under the heading "Bailing or Pumping Test" on older logs or "Well Test" on newer logs are the parameters necessary to help establish the initial efficiency of your well. These parameters include: Pre-Pumping Static Level, Test Rate, Duration of Test, and Feet of Drawdown. The Pre-Pumping Static Level is the level to which water has stabilized in the well with no outside force acting upon it (the well is not pumping water). Subtracting the static water level from the total depth of the well results in the feet of water in the well. A five inch diameter well will store approximately one gallon per foot of water while a six inch diameter well will store approximately 1.5 gallons per foot of water. The Test Rate is the rate in gallons per minute that water was either pumped or bailed from the well. A bailer is a long tube the driller uses to remove water and/or sediment from the well. Feet of drawdown refers to the difference in feet between the pre-pumping static water level and the final pumping level measured by the driller at the end of the well test. For example, if a well has a 50 foot static water level and a final pumping level of 75 feet, the Feet of Drawdown would be 25. If the water level remains constant during

pumping, the water is being replenished at the same rate it is being pumped. This would be a very efficient well. In general, wells with lesser drawdowns will be more efficient wells. Wells with higher or total drawdowns are often very inefficient, low yielding wells. The "Duration of Test" is simply how long the driller bailed or pumped water during the test.

A cone of depression is formed whenever a well is pumped. This cone of depression is best described as a three dimensional cone surrounding the well that represents the volume of water removed as a result of pumping. This cone is deepest and steepest near the wellbore and flattens out as distance from the well increases. Generally speaking, the larger the withdrawal, the larger the cone. Since no two cones of depression are ever identical, it is necessary to perform a pumping test to determine the size and shape of the cone. The figure below illustrates these concepts.

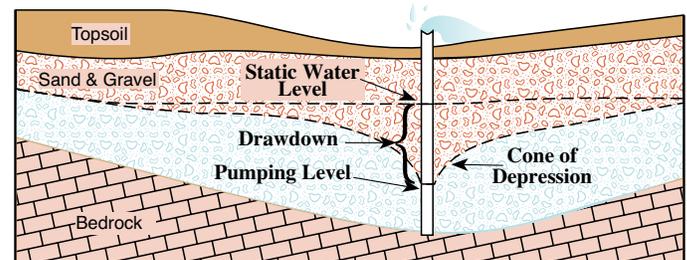


Figure 1. Water level terminology

It is also important to know the depth at which the pump or intake is set. The water level should always be above the level of the pump or intake. If the driller did not install the pump, this information may not be on the well log.

Well yield and efficiency will often decrease over time. Drawdown will increase and yield can decrease due to blockage of the well screen. Small particles suspended in the water can adhere to the sides of the well or the material at the bottom of the well can heave, partially blocking the flow of water into the well. These conditions rarely happen overnight. They usually take years to develop,

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often so slowly the homeowner does not even know it is occurring until it is too late.

Seasonal variations can also affect the water level in a well. The water level does not remain the same all year. It is highest in the Spring, at the end of the recharge season and lowest in late Fall at the end of the growing season. Severe droughts during the recharge season or a prolonged drought anytime can substantially lower the water table.

Homeowners with older wells or who are just concerned about their well should contact a water well driller or plumber. This professional can document the current conditions within the well and perform a mini pumping test if necessary.

The driller or plumber should first inspect the well and pressure tank for any obvious problems. This may entail pulling the tubing and pump and inspect them for any defects, corrosion, fouling, etc. They should check the current depth of the well and compare it to the initial well depth reported on the well log. If the current depth is less than the original depth, the driller may clean out the well by bailing it until the original depth is restored. If appropriate, the driller may then conduct a mini pumping test.

During a mini pumping test, water is pumped from the well at a known and constant rate (yield) for a set period of time. For most domestic wells, one hour of pumping is usually adequate to determine a pumping level and drawdown. Water levels will decline during the test and these drawdown measurements are obtained and recorded at predetermined intervals for the duration of the test. This information should be documented and compared to the original data. If a well log was not filed, the information gathered by the driller during the test will allow an estimate of the current safe, sustainable yield and efficiency of the well.

Any subsequent monitoring of the static water level or pumping conditions should be documented. Any time the well is serviced, it should be chlorinated or disinfected to Health Department standards.

The following checklist contains parameters that should be documented by a water well driller or pump installer/plumber.

Well Inspection Checklist

	Condition of Pump
	Condition of Pressure Tank
	Condition of Treatment Equipment/Filters
	Depth of Pump Setting (ft)
	Total Depth of Well (ft)
	Static Water Level (ft)
	Test Rate (gpm)
	Test Duration (hrs)
	Pumping Water Level (ft)

Any other questions, comments, concerns, or fact sheet requests, should be directed to:

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